



Via email and U.S. Mail

February 11, 2005

John N. Wachtler
Minnesota Environmental Quality Board
658 Cedar Street
St. Paul, MN 55155

Re: Docket MEQB No. 03-73-TR-Xcel
EQB Data Request Numbers 11 through 13

Dear Mr. Wachtler:

Here are Xcel Energy's responses to EQB staff's information requests 11, 12 and 13 regarding the Split Rock to Lakefield 345 kV & Chanarambie to Nobles County 115 kV transmission line project. We are available to provide additional information or meet with you in person to discuss any questions in more detail. .

Request 11 Construction Period Reliability

Xcel Energy's response to Request 11 is enclosed.

Request No. 12 Post-Construction Reliability

Construction of portions of the new Split Rock-Nobles Co-Lakefield Junction 345 kV line segments on double-circuit 345/161 kV structures (carrying portions of the existing Split Rock-Lakefield Junction 161 kV line) causes reliability concerns during construction, but does not result in any new load-serving reliability concerns following completion of construction. This is because the two circuits are used for two different purposes.

The 161 kV circuit as it exists today provides a high-voltage transmission source to several counties in southwest Minnesota. Upon completion of the 345/161 kV double circuit segments, the two circuits would serve different functions. The 161 kV line would serve the same load-serving function. In contrast, the 345 kV circuit would provide bulk transmission for generation in the area. From a load-serving reliability perspective, outage (failure) of both circuits on the 345/161 kV double-circuit line is electrically equivalent to the post-contingent configuration that results today.

This conclusion of "no impact on load-serving reliability due to double-circuiting" is correct in the immediate post-construction timeframe. Eventually, load growth may render the 161 kV line inadequate for local load-serving purposes. At that time, it may be advantageous to install a 345/161

kV or 161/115 kV transformer at Nobles County Substation to provide another power source to this 161 kV system. From that time forward, it is likely that double-circuit (345/161 kV line) outages could become the limiting contingency with respect to local load serving capability. Detailed power flow studies would need to be performed to determine the MW load levels at which such limitations would arise and how far into the future that potential would first become realized. At this time it is not envisioned to be an issue within the normal planning horizon.

Request No. 13 Advisability of Ordering Structures Capable of Double-Circuiting (115 kV Line)

As the EQB Staff is aware, there are currently multiple studies underway exploring how to increase available transmission capacity from the Buffalo Ridge to the larger load centers, primarily the Twin Cities. (*See Xcel Energy's Response to Data Request No. 9*). In these studies, engineers are analyzing the system not as it exists today, but as it will exist when the 825 MW outlet plan is completed and the four new lines authorized by the Certificate of Need in March 2003 are energized. This 825 MW transmission outlet plan assumes 200 MW of generation will be connected at Yankee Substation, 200 MW will be connected at Fenton Substation and 425 MW will be connected elsewhere in southwest Minnesota.

To further increase wind generation outlet capacity, the Buffalo Ridge Incremental Generation Outlet Study is evaluating 115 kV transmission options that can provide an additional several hundred megawatts beyond 825 MW of wind generation outlet from the southwest Minnesota Buffalo Ridge. In their analysis, study participants have identified failure of the new Nobles County to Fenton 115 kV line as a key limiter to adding generation on the Buffalo Ridge above 825 MW. That is, when wind generation in southwest Minnesota is increased beyond 825 MW, the outage of the Nobles to Fenton 115 kV line results in:

- Instantaneous voltage collapse when generation at Fenton exceeds approximately 250 MW.
- Overload of other lines in southwestern Minnesota, including the 42-mile Pipestone to Pathfinder 115 kV line, the 13-mile Lyon County to Yellow Medicine 69 kV line and others.

The Incremental Generation Outlet Study group identified several options that solved both of these problems. In its preliminary findings, the study group determined that a second Nobles County to Fenton 115 kV line, built on poles separate from the first, is the best solution to both the voltage collapse and overload problems. Other options in the study require more miles of line construction, have higher line losses (meaning less of the generated power reaches consumers), and are more expensive.

The issue with the Nobles County to Fenton #1 line is one of redundancy, not capacity. When the Nobles County to Fenton #1 line is out of service, adequate system redundancy is necessary in order to avoid the voltage collapse and thermal overloads. A second circuit between Nobles County and Fenton best provides that redundancy if it is on separate poles. Placing both Nobles County to Fenton 115 circuits on the same poles does not solve the problems described above. If placed on the same poles, the second circuit will not result in an increase in generator outlet for southwest

Minnesota. NERC planning criteria and related MISO/MAPP/MRO requirements mandate that a failure of both circuits on a double circuit structure be evaluated as a single outage event. This is because there are many “common-mode” failure mechanisms, such as a lightning strike, that do cause the simultaneous outage of both circuits. Consequently, adding a second circuit between Noble County and Fenton does not solve the problem to be addressed because both circuits can experience simultaneous outages caused by a single event.

The electrical solution of adding a separate Nobles County-Fenton 115 kV line is based on adherence to NERC planning criteria as well as consideration of the MISO methodology for evaluating transmission service requests for additional generation outlet capacity from the Buffalo Ridge. A double circuit line is not appropriate here because the second Nobles County-Fenton line is needed to address overloading of another line and voltage collapse, both of which arise from failure of the first circuit. NERC criteria render double circuiting ineffective in such cases. *See* NERC Planning Standards' Table I, "Transmission System Standards". Specifically, when, as here, the deficiency to be addressed is "cascading" (resultant trip out of other transmission circuits due to excessive loading, voltage collapse, or other cause), instability, violation of voltage criteria, and applicable thermal ratings", double circuit lines are effectively considered one circuit, not two. As a result, the Pipestone-Pathfinder overload and voltage collapse problems cannot be solved by a double circuit construction of Nobles County-Fenton 115 kV. Applying NERC criteria, if there were a failure in the first new 115 kV Nobles-Fenton line, there would be no second line available because both lines would be treated as out of service under the contingency analysis. Thus, if a double circuit 115 kV line were built, the Pipestone-Pathfinder overload would still occur and another "fix" would need to be designed.

Considering all the above information, adding a second 115 kV line on the same structures as the new Nobles County to Fenton 115 kV line would not provide any additional transmission capacity for the Buffalo Ridge area generation. Therefore, ordering double circuit structures is not advisable.

Xcel Energy would like to note that the advisability on double circuit structures needs to be analyzed on a case-by-case basis. There may be other projects where double circuit construction would not be an issue.

Please contact me at 715-839-4661 or pamela.jo.rasmussen@xcelenergy.com. If I am unavailable, please feel free to contact Grant Stevenson at 612-330-6330.

Sincerely,



Pamela Jo Rasmussen
Team Lead, Siting & Permitting

Attachments

- Data Request 11
- NERC Table 1